COVANCE
THE DEVELOPMENT SERVICES COMPANY

3301 Kinsman Boulevard
Madison, WI 53704

Certificate of Analysis

Final Report

Print Date: 03-May-2010 5:19 pm
Report Date: 03-May-2010
Report Number: 228334-0

National Institutes of Health

BLDG 14A, RM 119A8
Bethesda Maryland 20892 United States

ACCREDITED
Testing Cert #2918.01

Client Sample Name:	**NIHUNG Diet-021810**	**Covance Sample Number:**	**437986**
Project ID	NAT_INST-20100413-0006	**Receipt Date**	13-Apr-2010
PO Number	Req#1555147/Charge-VISA	**Receipt Condition**	Ambient temperature
		Login Date	13-Apr-2010
		Storage Condition at Covance	-20 (+/- 10) Degrees Celsius
		Number Composited	1
		Disposal Instructions	Dispose 30 days after final reported

Analysis/Result	Result
Fat by Acid Hydrolysis	
Fat	4.2 %
Crude Fiber *	
Crude Fiber	12.8 %
Protein (N x 6.25) Dumas Method	
Protein	15.6 %
Vitamin A *	
Vitamin A	12000 IU/kg
Vitamin D *	
Vitamin D	2110 IU/kg
Vitamin D2	<200 IU/kg
Vitamin E *	
Vitamin E	13.5 IU/kg
Thiamin *	
Thiamin	8.8 ppm
Riboflavin *	
Riboflavin	14.8 ppm
Niacin *	
Niacin	77.9 ppm
Pyridoxine Hydrochloride *	
Pyridoxine Hydrochloride	16.6 ppm
Folic Acid	
Folic Acid	2.97 ppm
Vitamin B12 *	
Vitamin B12	25.7 mcg/kg
Biotin *	
Biotin	0.500 ppm
Pantothenic Acid *	
Pantothenic Acid	31.8 ppm
Selenium *	
Selenium	0.220 ppm
Elements by ICP Emission Spectrometry	
Calcium	1.28 %
Copper	9.68 ppm

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Analysis/Result	Result
Elements by ICP Emission Spectrometry	
Iron	290 ppm
Magnesium	0.219 %
Manganese	54.9 ppm
Phosphorus	0.698 %
Potassium	1.44 %
Sodium	0.559 %
Zinc	149 ppm
Ash	
Ash	8.64 %
Moisture	
Moisture	10.5 %
Escherichia coli Count *	
Escherichia Coli	<10 CFU/g
Listeria *	
Listeria	Negative /25 g
Salmonella BAM (Rapid method) *	
Salmonella	Negative /25 g
Yeast and Mold Count *	
Yeast Count	15 CFU/g
Mold Count	90 CFU/g
Elements by ICP Mass Spectrometry *	
Antimony	22.7 ppb
Arsenic	251 ppb
Cadmium	86.8 ppb
Lead	175 ppb
Mercury	11.9 ppb
Molybdenum	2140 ppb
N-methylcarbamates *	
Aldicarb	<20.0 ppb
Aldicarb Sulfone	<20.0 ppb
Aldicarb Sulfoxide	<20.0 ppb
Carbofuran	<20.0 ppb

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Analysis/Result	Result
N-methylcarbamates *	
3-Hydroxycarbofuran	<20.0 ppb
Methomyl	<20.0 ppb
Carbaryl	<20.0 ppb
Bendiocarb	<20.0 ppb
Butocarboxim	<20.0 ppb
Butoxycarboxim	<20.0 ppb
Dioxacarb	<20.0 ppb
Ethiofencarb	<20.0 ppb
Fenobucarb	<20.0 ppb
Isoprocarb	<20.0 ppb
Methiocarb	<20.0 ppb
Metolcarb	<20.0 ppb
Oxamyl	<20.0 ppb
Promecarb	<20.0 ppb
Propoxur	<20.0 ppb
Thiofanox	<60.0 ppb
Organochlorinated Pesticides	
Tecnazene	<12.5 ppb
HCB	<6.5 ppb
Alpha-BHC	<12.5 ppb
Propyzamide	<25.0 ppb
DCNA	<18.5 ppb
PCNB	<10.0 ppb
Gamma-BHC	<12.5 ppb
Beta-BHC	<12.5 ppb
Heptachlor	<12.5 ppb
Chlorothalonil	<12.5 ppb
Delta-BHC	<12.5 ppb
Vinclozolin	<25.0 ppb
Aldrin	<12.5 ppb
DCPA	<18.5 ppb
Heptachlor Epoxide	<12.5 ppb

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Analysis/Result	Result
Organochlorinated Pesticides	
Endosulfan I	<12.5 ppb
Dieldrin	<12.5 ppb
Captan	<50.0 ppb
Folpet	<31.5 ppb
p,p' - DDE	<12.5 ppb
Endrin	<18.5 ppb
Oxadiazon	<37.5 ppb
Endosulfan II	<18.5 ppb
p,p' - DDD	<18.5 ppb
p,p' - DDT	<25.0 ppb
Endosulfan Sulfate	<18.5 ppb
Captafol	<31.5 ppb
Dicofol	<31.5 ppb
Mirex	<12.5 ppb
Tetradifon	<18.5 ppb
Methoxychlor	<31.5 ppb
Cis-Permethrin	<21.3 ppb
Cypermethrin	<94.0 ppb
Toxaphene	<100 ppb
Arochlor 1254	<200 ppb
Tech Chlordane	<50.0 ppb
Trans-Permethrin	<41.2 ppb
Telodrin	<20.0 ppb
Organophosphate Pesticides *	
Vapona	<15.0 ppb
Methamidophos	<15.0 ppb
Mevinphos	<25.0 ppb
Acephate	<40.0 ppb
Omethoate	<35.0 ppb
Thimet	<20.0 ppb
Demeton-S	<25.0 ppb
Fonofos	<25.0 ppb

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Analysis/Result	Result
Organophosphate Pesticides *	
Diazinon	<20.0 ppb
Disulfoton	<25.0 ppb
Dimethoate	<20.0 ppb
Propetamphos	<30.0 ppb
Dichlofenthion	<30.0 ppb
Me-Chlorpyrifos	79.2 ppb
Ronnel	<20.0 ppb
Me-Parathion	<20.0 ppb
Me-Pirimiphos	<25.0 ppb
Et-Chlorpyrifos	<25.0 ppb
Fenitrothion	<25.0 ppb
Malathion	171 ppb
Et-Parathion	<20.0 ppb
Chlorfenvinphos	<40.0 ppb
Methidathion	<30.0 ppb
Prothiophos	<30.0 ppb
Ethion	<20.0 ppb
Trithion	<30.0 ppb
Phosmet	<35.0 ppb
EPN	<40.0 ppb
Azinphos-Methyl	<40.0 ppb
Phosalone	<40.0 ppb
Coumaphos	<50.0 ppb

Method References	Testing Location
Ash (ASHM_S:5)	**Covance Laboratories Inc.**
Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Method 923.03, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)	

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Method References — Testing Location

Biotin (BIOM_S:11) — **Covance Laboratories Inc.**

Scheiner, J. and De Ritter, "Biotin Content of Feedstuffs," Journal of Agricultural Food Chemistry, 23(6):1157-1162 (1975). (Modified)

Wright and Skeggs, Procedures of the Society of Experimental Biology and Medicine, 56:95, (1944). (Modified)

Methods of Analysis for Infant Formulas, Infant Formula Council, (1985). (Modified)
Journal of the AOAC, 49:882, (1996). (Modified)

Crude Fiber (CFIB_S:2) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 962.09.

Elements by ICP Emission Spectrometry (ICP_S:11) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Method 984.27 and 985.01, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Elements by ICP Mass Spectrometry (ICP_MS_S:11) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 993.14 (Modified).

Escherichia coli Count (COLC:5) — **Covance Laboratories Inc.**

Compendium of Methods for the Microbiological Examination of Foods, Colony Count Methods, 4th Edition, Chapter 6,7, American Public Health Association: Washington, D.C. (2001). Modified.

Fat by Acid Hydrolysis (FAAH_S:6) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 922.06 and 954.02, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Folic Acid (FOAN_S:12) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 960.46 and 992.05, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Methods of Analysis for Infant Formulas, Infant Formula Council, Atlanta, GA, Section C-2, (1985) (Modified).

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Method References — Testing Location

Listeria (LIRM:2) — **Covance Laboratories Inc.**

1. Bacteriological Analytical Manual, Listeria monocytogenes, 8th Edition,] Chapter 10, 2003. Food and Drug Administration, AOAC International: Gaithersburg, Maryland. Modified.
2. Compendium of Methods for the Microbiological Examination of Foods, Listeria, 4th Edition, Chapter 36, 2001. American Public Health Association Washington D.C. Modified.
3. Listeria Visual Immunoprecipitate (VIP), AOAC Official Method 997.03. Official Methods of Analysis of the AOAC International, 18th Edition, 2005. Gaithersburg, Maryland. Modified.

Moisture (M100T100_S:4) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 925.09 and 926.08, AOAC INTERNATIONAL, Gaithersburg, MD, USA,(2005). (Modified).

Niacin (NIAP_S:11) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Method 944.13 and 960.46, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005)

N-methylcarbamates (CARB_S:6) — **Covance Laboratories Inc.**

Food and Drug Administration, '401: Method for N-Methylcarbamates' , Pesticide Analytical Manual, Third Ed., Vol. 1, Food and Drug Administration, Washington, D.C. (1994).

Organochlorinated Pesticides (OPCL_S:15) — **Covance Laboratories Inc.**

Hopper, M. L. and Griffitt, K. R., "Evaluation of an Automated Gel Permeation Cleanup and Evaporation Systems for Determining Pesticide Residues in Fatty Samples", Journal of the Association of Official Analytical Chemists, Vol. 70, No. 4, pp. 724-726 (1987) (Modified).

Pesticide Analytical Manual, Volume 1: Multiresidue Methods, 3rd Ed., Chapter 3, "Multiclass Multiresidue Methods: 304 Method for Fatty Foods", Food and Drug Administration, Washington, D.C. (1999) (Modified).

Organophosphate Pesticides (OPOP_S:6) — **Covance Laboratories Inc.**

Hopper, M. L. and Griffitt, K. R., "Evaluation of an Automatic Gel Permeation Cleanup and Evaporation Systems for Determining Pesticide Residues in Fatty Samples", Journal of the Association of Official Analytical Chemists, Vol. 70, No. 4, pp. 724-726 (1987) (Modified).

Pesticide Analytical Manual, Volume 1: Multiresidue Methods, 3rd Ed., Chapter 3, "Multiclass Multiresidue Methods: 304 Method for Fatty Foods", Food and Drug Administration, Washington, D.C. (1999) (Modified).

Pantothenic Acid (PANN_S:10) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 945.74 and 960.46, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005)

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Method References — Testing Location

Protein (N x 6.25) Dumas Method (DGEN_S:5) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 968.06 and 992.15, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Pyridoxine Hydrochloride (B6A_S:11) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Method 961.15, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005).

Atkins, L., Schultz, A. S., Williams, W. L., and Frey, C. N., "Yeast Microbiological Methods for Determination of Vitamins," Industrial and Engineering Chemistry, Analytical Edition, 15:141-144, (1943).

Riboflavin (B2FV_S:10) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 940.33 and 960.46, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005).

The United States Pharmacopeia, 29th Ed., p. 1913, United States Pharmacopeial Convention, Inc.: Rockville, Maryland (2005).

Salmonella BAM (Rapid method) (SARM:2) — **Covance Laboratories Inc.**

1. Bacteriological Analytical Manual, Salmonella, Chapter 5, 8th Edition, 2006. Food and Drug Administration, AOAC International: Gaithersburg, Maryland. Modified.
2. Compendium of Methods for the Microbiological Examination of Foods, Salmonella, Chapter 37, 4th Edition, 2001. American Public Health Association. Washington D.C. Modified.
3. Salmonella in Foods, AOAC Official Method 990.13, DNA hybridization Method. Official Methods of Analysis of the AOAC International, 18th Edition, 2005. Gaithersburg, Maryland. Modified.

Selenium (SEHG_S:4) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Method 986.15 and 996.17, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified).

Perkin Elmer, Flow Injection Mercury/Hydride Analyses, Recommended Analytical Conditions and General Information, Norwalk, CT, (1994) (Modified).

Thiamin (BIDE_S:6) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 942.23, 953.17, and 957.17, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005).

Vitamin A (AFD1_S:4) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 974.29, 992.04, and 992.06, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005).

Thompson, J.N., and Duval, S., "Determination of Vitamin A in Milk and Infant Formula by HPLC", Journal of Micronutrient Analysis, 6:147-159, (1989).

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Vitamin B12 (B12F_S:11) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 952.20 and 960.46, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005).

The United States Pharmacopeia, 29th Ed., pp. 603-4, United States Pharmacopeial Convention, Inc.: Rockville, Maryland (2005).

Methods of Analysis for Infant Formulas, Infant Formula Council, Atlanta, Georgia, Section C-2, (1985).

Vitamin D (DFD1_S:7) — **Covance Laboratories Inc.**

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 982.29. (Modified)

Vitamin E (EFD1_S:3) — **Covance Laboratories Inc.**

Cort, W. M., Vincente, T. S., Waysek, E. H., and Williams, B. D., Journal of [Agricultural Food Chemistry, 31:1330-1333 (1983). (Modified)

Speek, A. J., Schijver, J., and Schreurs, W. H. P., Journal of Food Science, 50:121-124 (1985). (Modified)

McMurray, C. H., Blanchflower, W. J., and Rice, D. A., Journal of the Association of Official Analytical Chemists, 63: 1258-1261 (1980).

Yeast and Mold Count (YMCM:5) — **Covance Laboratories Inc.**

1. Bacteriological Analytical Manual, Yeasts, Molds and Mycotoxins. Chapter 18, 8th Edition, 2001. Food and Drug Administration, AOAC International: Gaithersburg, Maryland. Modified.

2. Compendium of Methods for the Microbiological Examination of Foods, Yeasts and Molds, Chapter 20, 4th Edition, 2001. American Public Health Association, Washington D.C. Modified.

3. Yeast and Mold Counts in Foods, AOAC Official Method 997.02. Dry Rehydratable Film Method (Petrifilm). Official Methods of Analysis of the AOAC International, 18th Edition, 2005. Gaithersburg, Maryland. Modified.

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Released on Behalf of Covance by

Doug Winters
Laboratory Director

For questions on this report, please contact your Client Service Representative at 608-242-2712 x4170

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